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ABSTRACT

This competency-based module uses the Ocean County (New Jersey) Vocational-Technical Schools curriculum-infused model for infusing basic skills instruction into vocational education. The model demonstrates the relationship of vocational skills to communication, mathematics, and science. The document begins with a philosophy statement; preface; a table that explains the number of hours required for academic credit in various programs and the number of those hours that are devoted to basic skills and vocational activities; matrices that show in which courses specific basic skills are taught; a list of objectives; and an explanation of student activities. Most pages in the document are tables that describe the relationship of vocational skills to basic skills within the design drafting program. These pages are organized by instructional unit and the topics within them. For each topic and associated task(s) are listed the theory and basic skills covered. Also listed are the expected student outcomes. The 13 instructional units included are: orientation; technical drawing; engineering working drawings; residential design; residential construction; residential working drawings; rendering; energy-efficient design; commercial construction; commercial working drawings; structural design; mechanical systems; and computer-aided design. (CML)

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Competency Based Vocational Curricula

COM-LINK

With Basic Skills And Academic Linkages

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In Cooperation With The

New Jersey State Department of Education

Division of Vocational Education

And

Ocean County Vocational-Technical School

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Ocean County Vocational-Technical School

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PHILOSOPHY OF EDUCATION

The Ocean County Vocational-Technical Education Program should consist of those courses, activities and experiences which are designed to prepare students for a successful entrance in a given field of work. The program should be based upon an analysis of the worker needs of the field of work, the opportunities and requirements for entrance, and the particular characteristics and needs of the students.

We believe that:

The school should educate and train the students to live effectively in our ever-changing world.

The school should provide, for each student, intensive training toward general and specific job objectives, and setting standards of performance in keeping with the requirements of that particular field of work.

All students should evidence the interest, aptitude, and ability to profit from the specialized instruction, and this should be a condition of entrance into or continuance in a given field of work.

Equal attention should be given in the school program to develop sound character, good citizenship, ability to think critically, and maintain good mental and physical health.

The school must be constantly striving to fulfill its ultimate purpose; that of serving the students and the community. The school should give careful consideration to the needs, interests, and capacities of the students and the educational and technical background, experience, training, and professional interest of the professional staff as they develop a working philosophy of education.

PREFACE

The curriculum format employed by this project is competency based and utilizes the Ocean County Vocational-Technical Schools' curriculum infused model for the teaching of basic skills as part of vocational education. The design demonstrates the relationship of vocationally related skills to communication, mathematics and science knowledge. Proficiences with regard to student outcomes cannot be achieved without mastery in related academic areas. All student outcome objectives are predicated upon entry level skills which reflect the dictates of the job marketplace and industry. In addition, basic skills matrices developed by the district are included. The totality of this package is designed to facilitate the vocational teaching process and to enchance the learning experiences of our students.

POTENTIAL OPPORTUNITY FOR AWARDING ACADEMIC CREDITS FOR STUDENTS AT OCEAN COUNTY VOCATIONAL-TECHNICAL SCHOOL

450 hours - 1 year course at O.C.V.T.S.
900 hours - 2 year course at O.C.V.T.S.
1000 hours - 2 year Beauty Culture course

120 hours per year needed for 5 credits
60 hours per year needed for 2½ credits

COURSE	TOTAL HOURS	HOURS SPENT ON COMMUNICATION SKILLS	HOURS SPENT ON COMPUTATION SKILLS	HOURS SPENT ON SCIENCE	TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP
AIR CONDITIONING, REFRIGERATION AND HEATING	900	140	120	120	520
AUTO BODY REPAIR	900	130	120	125	525
AUTOMOTIVE MECHANICS	900	150	120	120	510
AUTOMOTIVE AND DIESEL ENGINE REBUILDING	900	216	126	125	433
BEAUTY CULTURE I AND II	1000	240	120	130	515
BUILDING TRADES	900	135	120	130	515
BUSINESS RELATIONS - MEDIA/MODELING	450	200	60	40	150
CHILD CARE AIDE	900	240	120	122	418
COMMERCIAL ART AND PRINTING	900	120	215	75	580
COMMERCIAL BUILDING CONSTRUCTION (MASONRY)	900	130	125	130	515

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COURSE	TOTAL HOURS	HOURS SPENT ON COMMUNICATION SKILLS	HOURS SPENT ON COMPUTATION SKILLS	HOURS SPENT ON SCIENCE	TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP
COMMERCIAL PHOTOGRAPHY & TELEVISION PRODUCTION	900	150	125	80	545
CUSTOM CABINETMAKING	900	130	120	60	590
DENTAL ASSISTING	450	168	65	77	140
DESIGN DRAFTING	900	135	150	165	450
ELECTRICAL TRADES	900	106	120	124	550
FASHION MERCHANDISING	450	200	60	40	150
FOOD SERVICES	900	206	132	125	437
INDUSTRIAL AUTOMATION AND ELECTRONICS	900	129	140	132	499
INTERIOR DESIGN	900	210	130	120	440
LANDSCAPING AND GREENHOUSE TECHNOLOGY	900	125	125	175	475

POTENTIAL OPPORTUNITY FOR AWARDING ACADEMIC CREDITS FOR STUDENTS AT OCEAN COUNTY VOCATIONAL-TECHNICAL SCHOOL

450 hours - 1 year course at O.C.V.T.S.
900 hours - 2 year course at O.C.V.T.S.
1000 hours - 2 year Beauty Culture course

120 hours per year needed for 5 credits
60 hours per year needed for 2½ credits

COURSE	TOTAL HOURS	HOURS SPENT ON COMMUNICATION SKILLS	HOURS SPENT ON COMPUTATION SKILLS	HOURS SPENT ON SCIENCE	TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP
MARINE ENGINE AND BOAT SERVICES	900	164	120	125	491
MEDICAL OFFICE RECEPTIONIST/ASSISTANT	450	173	60	77	140
MEDICAL SKILLS AND RELATED HEALTH CAREERS	450	135	65	125	125
MEDICAL SKILLS (ADVANCED)	450	125	60	125	140
PLUMBING AND HEATING	900	140	120	120	520
RECREATIONAL VEHICLE MAINTENANCE AND REPAIR	900	125	130	60	585
T.V. AND COMPUTER REPAIR	900	125	150	175	450
WELDING	900	135	120	100	545

COMMUNICATION SKILLS

Listed below are all courses offered at the Ocean County Vocational-Technical School. The asterisk indicates that the topic is studied in that curriculum.

COURSE	Functional Reading Skills	Vocabulary	Identifying Main Ideas	Meanings in Context	Inferences	Fact/Opinion Distinction	Signal Words	Parts of Text-book/Manual	Following Directions	Outlining and Note Taking	Interpretation of Maps, Graphs and Charts	Interpretation of Diagrams	Test Taking Skills	Expository Writing Skills	Problem Solving	Spelling	Oral Communications	Study Skills	Resume Writing	Job Application Skills
AIR CONDITIONING, REFRIGERATION AND HEATING	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
AUTO BODY REPAIR	*	*		*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
AUTOMOTIVE MECHANICS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
AUTOMOTIVE AND DIESEL ENGINE REBUILDING	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BEAUTY CULTURE I AND II	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BUILDING TRADES	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*	*	*
CHILD CARE AIDE	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
COMMERCIAL ART AND PRINTING CAREERS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
COMMERCIAL BUILDING CONSTRUCTION (MASONRY)	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CUSTOM CABINETMAKING	*	*		*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
DENTAL ASSISTING	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*

COMMUNICATION SKILLS - CONTINUED

COURSE	Functional Reading Skills	Vocabulary	Identifying Main Ideas	Meanings in Context	Inferences	Fact/Opinion Distinction	Signal Words	Parts of Text-book/Manual	Following Directions	Outlining and Note Taking	Interpretation of Maps, Graphs and Charts	Interpretation of Diagrams	Test Taking Skills	Expository Writing Skills	Problem Solving	Spelling	Oral Communications	Study Skills	Resume Writing	Job Application Skills
DESIGN DRAFTING	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
ELECTRICAL TRADES	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
FASHION MERCHANDISING	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
FOOD SERVICES	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
INDUSTRIAL AUTOMATION AND ELECTRONICS	*	*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*
INTERIOR DESIGN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LANDSCAPING AND GREENHOUSE TECHNOLOGY	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
MARINE ENGINE AND BOAT SERVICE	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MEDICAL OFFICE RECEPTIONIST/ASSISTANT	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
MEDICAL SKILLS AND RELATED HEALTH CAREERS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MEDICAL SKILLS (ADVANCED)	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
PLUMBING AND HEATING	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
RECREATIONAL VEHICLE MAINTENANCE AND REPAIR	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
T.V. AND COMPUTER REPAIR	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
WELDING	*	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

MATHEMATICS SKILLS

Listed below are all courses offered at the Ocean County Vocational-Technical School. The asterisk indicates that the topic is studied in that curriculum.

COURSE	Whole Numbers	Common Fractions	Decimals	Percentages	Weights and Measurements	Ratio and Proportion	Powers and Roots	Formulas	Estimating	Geometry	Basic Trigonometric Functions	Graphs
AIR CONDITIONING, REFRIGERATION AND HEATING	*	*	*	*	*	*	*	*	*	*	*	*
AUTO BODY REPAIR	*	*	*	*	*	*	*	*	*	*		*
AUTOMOTIVE MECHANICS	*	*	*	*	*	*	*	*	*			*
AUTOMOTIVE AND DIESEL ENGINE REBUILDING	*	*	*	*	*	*	*	*	*	*		*
BEAUTY CULTURE I AND II	*	*	*	*	*	*	*	*	*	*	*	*
BUILDING TRADES	*	*	*	*	*	*	*	*	*	*	*	*
BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL	*		*	*		*			*			*
CHILD CARE AIDE	*	*	*	*	*	*		*	*	*	*	*
COMMERCIAL ART AND PRINTING CAREERS	*	*	*	*	*	*		*	*	*		*
COMMERCIAL BUILDING CONSTRUCTION (MASONRY)	*	*	*	*	*	*	*	*	*	*	*	*
COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION	*	*	*	*	*	*	*	*	*	*	*	*
CUSTOM CABINETMAKING	*	*	*	*	*	*	*	*	*	*	*	*
DENTAL ASSISTING	*	*	*	*	*	*		*	*			*

MATHEMATICS SKILLS - CONTINUED

COURSE	Whole Numbers	Common Fractions	Decimals	Percentages	Weights and Measurements	Ratio and Proportion	Powers and Roots	Formulas	Estimating	Geometry	Basic Trigonometric Functions	Graphs
DESIGN DRAFTING	*	*	*	*	*	*		*	*	*	*	*
ELECTRICAL TRADES	*	*	*	*	*	*	*	*	*	*	*	*
FASHION MERCHANDISING	*	*	*	*	*	*		*	*	*		*
FOOD SERVICES	*	*	*	*	*	*		*	*	*		*
INDUSTRIAL AUTOMATION AND ELECTRONICS	*	*	*	*	*	*		*	*	*	*	*
INTERIOR DESIGN	*	*	*	*	*	*		*	*	*		*
LANDSCAPING AND GREENHOUSE TECHNOLOGY	*	*	*	*	*	*		*	*	*	*	*
MARINE ENGINE AND BOAT SERVICE	*	*	*	*	*	*		*			*	*
MEDICAL OFFICE RECEPTIONIST/ASSISTANT	*	*	*	*	*	*	*	*	*	*		*
MEDICAL SKILLS AND RELATED HEALTH CAREERS	*	*	*	*	*	*		*	*	*	*	*
MEDICAL SKILLS (ADVANCED)	*	*	*	*	*	*		*	*	*	*	*
PLUMBING AND HEATING	*	*	*	*	*	*	*	*	*	*	*	*
RECREATIONAL VEHICLE MAINTENANCE AND REPAIR	*	*	*	*	*	*	*	*			*	*
T.V. AND COMPUTER REPAIR	*	*	*	*	*	*	*	*		*	*	*
WELDING	*	*	*	*	*	*		*	*	*	*	*

SCIENCE SKILLS

Listed below are all courses offered at the Ocean County Vocational-Technical School. Those listed as "Not Available" do not offer enough hours to qualify for credits in your high school. However, we have noted the skills covered. Those listed with an asterisk after the title are eligible. The asterisk indicates that the topic is studied in that curriculum.

	HUMAN ANATOMY						ASTRONOMY			CHEMISTRY			PHYSICS					ECOLOGY				
COURSE	Cellular Theory	Skeletal System	Muscles	System of Body	Diseases	Psychology	Solar System	Gravity	Weather	Matter	Chemical Reactions	Applied Chemistry	Light	Magnetism	Heat	Magnetism and Electricity	Nuclear Energy	Botany	Food Production	Fuels	Nutrition	Waste Disposal
AIR CONDITIONING, REFRIGERATION AND HEATING							*	*	*	*	*	*		*	*	*				*	*	
AUTO BODY REPAIR								*	*	*	*	*	*	*	*					*		*
AUTOMOTIVE MECHANICS								*		*	*	*	*	*	*	*				*		
AUTOMOTIVE DIESEL AND ENGINE REBUILDING								*		*	*	*		*	*	*	*			*		*
BEAUTY CULTURE I AND II	*	*	*	*	*	*				*	*	*	*		*	*					*	
BUILDING TRADES							*	*	*	*	*	*	*		*	*		*		*		
BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL	N	* O	* T	* A	V	* A	I	L	A	B	L	E										
CHILD CARE AIDE	*	*	*	*	*	*			*		*	*		*	*			*	*		*	*
COMMERCIAL ART AND PRINTING CAREERS	N	O	T	A	V	A	I	* L	A	* B	* L	* E	*		*	*						*
COMMERCIAL BUILDING CONSTRUCTION (MASONRY)	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*		*		*	*	*
COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION	N	O	T	A	V	* A	I	* L	A	* B	* L	* E	*		*	*						*
CUSTOM CABINETMAKING	* N	O	T	A	V	A	I	* L	A	* B	* L	* E			*			*				
DENTAL ASSISTING	*	*	*	*	*	*				*	*	*	*								*	*

SCIENCE SKILLS - CONTINUED

COURSE	HUMAN ANATOMY						ASTRONOMY			CHEMISTRY			PHYSICS					ECOLOGY				
	Cellular Theory	Skeletal System	Muscles	System of Body	Diseases	Psychology	Solar System	Gravity	Weather	Matter	Chemical Reactions	Applied Chemistry	Light	Magnetism	Heat	Magnetism and Electricity	Nuclear Energy	Botany	Food Production	Fuels	Nutrition	Waste Disposal
DESIGN DRAFTING							*	*	*	*		*	*		*	*	*			*		*
ELECTRICAL TRADES							*	*	*	*	*		*	*	*	*	*		*			
FASHION MERCHANDISING	*	*	*	*		*		*		*	*	*	*								*	
FOOD SERVICES					*	*		*	*		*	*	*		*				*		*	*
INDUSTRIAL AUTOMATION AND ELECTRONICS								*		*			*	*	*	*	*			*		
INTERIOR DESIGN		*	*			*	*	*	*	*	*	*	*		*	*						
LANDSCAPING AND GREENHOUSE TECHNOLOGY							*	*	*		*	*	*		*	*		*	*	*	*	*
MARINE ENGINE AND BOAT SERVICE								*	*	*	*	*	*	*	*	*		*		*		
MEDICAL OFFICE RECEPTIONIST/ASSISTANT	N	* O	* T	* A	* V	* A	I	L	A	B	* L	E										*
MEDICAL SKILLS AND RELATED HEALTH CAREERS	*	*	*	*	*	*		*		*	*					*			*		*	*
MEDICAL SKILLS (ADVANCED)	*	*	*	*	*	*		*		*	*					*			*		*	*
PLUMBING AND HEATING					*		*	*	*	*	*	*			*	*		*		*		*
RECREATIONAL VEHICLE MAINTENANCE AND REPAIR	N	O	T	A	V	A	I	* L	A	* B	* L	* E	*	*	*	*				*		*
T.V. AND COMPUTER REPAIR										*	*	*	*	*	*	*				*		
WELDING								*		*	*	*	*	*	*	*				*		

COURSE OBJECTIVES

1. To prepare students with entry level skills, abilities and knowledge for employment in the drafting field.

2. To present 900 hours of instruction and practice in the drafting field in accordance with the course curriculum and skill profile outline.

3. To provide a detailed summary evaluation of the proficiency achieved by each student representing the most important content areas presented in the design drafting skill profile.

4. To help each student develop positive attitudes and ideals related to their occupation in the drafting field and understand their own capabilities and potential.

5. To instill in each student the need to plan for their professional growth through continuous learning in their chosen occupation.

STUDENT ACTIVITIES

All students enrolled in the Ocean County Vocational-Technical School are encouraged to join Vocational Industrial Clubs of America (VICA). Student activities are infused into each program. Each building has a student government and a student activities program separate from VICA. Additionally, students from each center and every class are encouraged to participate in the VICA Leadership and Job Demonstration Contests which begin in the centers and radiate throughout the district as Ocean County Vocational-Technical School inter school winners are chosen.

Student activities emphasize the basic precepts of VICA, as well as the basic tenets of democracy. Within the context, each of our programs teaches the dignity of work, high standards in trade ethics and safety, and a belief in the free enterprise economic system.

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UNIT: ORIENTATION

TOPIC: SAFETY

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Shop safety and safety rules II. OSHA regulations	A. No running in shop B. Print machine 1. Roller 2. Ammonia fumes C. Pencil points D. Compass points E. Eraser shields F. Electrical shock 1. Print machine 2. Electric eraser 3. Computer G. OSHA rules	A. Vocabulary - shop terms B. Spelling C. Following directions D. Note taking 1. Verbal 2. Chalkboard 3. Textbook		A. Applied chemistry - ammonia B. Physics 1. Heat 2. Light	The student will be able to pass a written test on safety within the shop area to include applicable OSHA regulations

UNIT: ORIENTATION - CONTINUED

TOPIC: CAREER OPPORTUNITIES

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify careers related to design drafting	A. Architect B. Civil engineer C. Drafter D. Designer E. Specification writer F. Illustrator G. Teacher H. Surveyor I. CADD technician J. Construction technologist K. Estimator L. Education 1. Vocational-technical school 2. Junior college 3. Four year college 4. Technical school	A. Note taking B. Vocabulary C. Spelling D. Functional reading skills			A. The student will be aware of the career opportunities available in the design drafting field
II. Educational requirements					B. The student will be aware of the educational requirements and opportunities available

UNIT: ORIENTATION - CONTINUED

TOPIC: SHOP ORGANIZATION AND MANAGEMENT

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify shop rules II. Identify school regulations	A. Attendance B. Make up work C. Homework D. Notebooks E. Field trips F. Daily grading system G. Student lockers H. Drawing files I. Dress code J. Clean up K. Credits L. Grading M. Graduation policy N. Post graduate opportunities 1. Two year college 2. Four year college 3. Technical school 4. Entry level employment O. Cooperative Industrial Education (C.I.E.)	A. Note taking B. Functional reading skills			A. The student will know what is expected of him/her in order to promote effective learning B. The student will know the standards and school requirements

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Freehand lettering of basic technical lettering II. Layout a title block III. Develop an individual style of lettering within accepted industry standards	A. Basic technical alphabet 1. Proportion 2. Direction of strokes 3. Spacing of characters and words B. Letter heights C. Use of guidelines D. Types of lettering 1. Architectural - vertical 2. Engineering - slanted E. Uppercase format F. Lettering devices - Wrico guides	A. Functional reading skills B. Following directions C. Interpretation of charts - letter size D. Spelling E. Vocabulary	A. Measurement - height of letters B. Ratio and proportion C. Graphs D. Whole numbers		A. The student will be able to exhibit the ability to letter the alphabet utilizing good industry accepted methods B. The student will be able to demonstrate his/her ability using the Wrico lettering guide C. The student will be able to layout a title block

UNIT: ORIENTATION - CONTINUED

TOPIC: USE OF INSTRUMENTS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Drawing exercises involving simple lines and measuring to acquaint students with the correct use of equipment II. Formation of correct habits in use of tools	A. Alphabet of lines 1. Object 2. Hidden 3. Center 4. Cutting plane B. Accuracy in measuring C. Neatness D. Use of compass 1. Bow 2. Beam 3. Drop bow E. Triangles 1. 30°/60° 2. 45° 3. Adjustable F. Straightedge G. Scale H. Templates 1. Circle 2. Square	A. Note taking 1. Chalkboard 2. Handouts B. Vocabulary C. Line chart D. Interpretation of diagrams	A. Measurement - scale B. Fractions C. Decimals D. Formulas E. Whole numbers F. Geometry 1. Angles 2. Circles a. circumference b. radius c. diameter d. chord		A. The student will be able to draw simple line, arc, circular objects using basic drafting tools B. The student will be able to measure accurately several lines of varying length to various scales

UNIT: ORIENTATION - CONTINUED

TOPIC: DIAZO PRINT MACHINE OPERATION

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Select proper speed on diazo machine II. Set developer to proper position III. Make a white print from a transparent original drawing	A. Materials 1. Tracing paper original 2. Plastic film 3. Diazo print paper 4. Ammonia B. Print machine operation 1. Proper speed 2. Order of operations	A. Manufacturers manual B. Nomenclature C. Spelling D. Following directions	Whole numbers	A. Applied chemistry - precautions with ammonia (26% pure) B. Physics 1. Light 2. Heat	The student will be able to make a blue line copy of an original transparent drawing

UNIT: TECHNICAL DRAWING

TOPIC: GEOMETRIC CONSTRUCTIONS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Construct the following geometric shapes A. Circle B. Triangle C. Hexagon D. Octagon II. Draw an ellipse by concentric circle method III. Bisect a line IV. Divide a line into equal parts V. Construct an ogee or reverse curve	A. Use of scale B. Triangles 1. 30/60 2. 45 3. Adjustable C. Compass D. Dividers E. Angular rule method F. Tangencies G. Acute angles H. Obtuse angles	A. Following directions B. Note taking C. Functional reading skills	A. Measurement B. Fractions C. Decimals D. Angles E. Plane geometry 1. Arcs 2. Circles 3. Ellipses		A. The student will be able to draw geometric shapes using proper drafting tools B. The student will be able to accurately measure geometric shapes C. The student will be able to calculate angles from geometric constructions D. The student will be able to construct an ellipse

UNIT: TECHNICAL DRAWING - CONTINUED

TOPIC: FREEHAND SKETCHING

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Make two dimensional drawings using only paper and pencils II. Make three dimensional drawings using only paper and pencils III. Apply shades and shadows to two and three dimensional sketches	A. Materials 1. Pencils 2. Paper B. Techniques 1. Proportion 2. Scale C. Block in subjects D. Sketching angles E. Sketching circles and arcs 1. Two dimensional 2. Isometric 3. Perspective F. Sketching plans and elevations G. Shading and shadows 1. Tone 2. Line	A. Note taking 1. Chalkboard 2. Overhead projector B. Interpretation of diagrams	A. Proportion B. Geometry - shapes C. Graphs		A. The student will be able to make freehand sketches in proportion B. The student will be able to shade and shadow two and three dimensional objects to approximate actual lighting conditions

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Draw three dimensional objects in a two dimensional format II. Identify surfaces located behind principle views	A. Principles of projection B. Relationship of views C. Third angle projection D. Hidden lines - hidden surfaces E. Freehand sketching F. Mitre line G. Selection of views H. Precedence of lines	A. Note taking - chalkboard B. Overhead transparencies C. Vocabulary D. Problem solving	A. Measurement - scale B. Decimals C. Fractions D. Geometry 1. Bisect lines 2. Concentricity		A. The student will be able to sketch three dimensional objects on a flat plane B. The student will be able to draw three dimensional objects in two dimensions accurately C. The student will be able to draw using the mitre line system

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Draw exercises involving the basic types of sections II. Construct a sectional view involving nearly complete objects with voids and surfaces beyond the cutting planes III. Identify symbols used in sectional views	A. Sectioning principles B. Cutting plane C. Conventions D. Symbols of materials 1. Cast iron 2. Steel 3. Bronze, brass 4. Brick 5. Stone 6. Concrete 7. Earth 8. Insulation 9. Other E. Full sections F. Half sections G. Broken out H. Revolved section I. Pictorial section	A. Note taking 1. Chalkboard 2. Overhead projector 3. Textbook B. Following directions C. Interpretation of diagrams D. Vocabulary E. Spelling	A. Measurement 1. Standard 2. Metric B. Geometry 1. Circles 2. Arcs 3. Triangles	Applied chemistry - nature of materials 1. Hardness 2. Softness	A. The student will be able to identify the symbols used in drawing sections B. The student will be able to distinguish between a full and half section C. The student will be able to change a given regular view to a sectional view

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Draw a true view of a three dimensional object when a surface is not perpendicular to the plane of projection	A. Views 1. Normal 2. Inclined 3. Skewed B. Partial auxiliary views C. Secondary auxiliary views D. Intersections of planes and cones, cylinders and curved surfaces E. Relationship of auxiliary planes to principle planes of projection	A. Functional reading skills 1. Textbook 2. Handouts B. Vocabulary C. Note taking 1. Chalkboard 2. Verbal D. Interpretation of diagrams	A. Measurement 1. Standard 2. Metric B. Decimals C. Fractions D. Geometry - angles 1. Right 2. Obtuse 3. Acute		A. The student will be able to project an inclined view from a normal orthographic view B. The student will be able to identify an inclined surface C. The student will be able to draw a secondary auxiliary view

UNIT: TECHNICAL DRAWING - CONTINUED

TOPIC: DIMENSIONING

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Accurately show sizes of engineering and architectural objects II. Show locations of circles, arcs and breaks within an object	A. Use of scale 1. Architects 2. Engineers B. Principles of dimensioning technical drawings 1. Dimension lines 2. Arrowheads 3. Leaders 4. Size 5. Location C. Strings of dimensions 1. Overall 2. Breaks 3. Openings D. Line weight E. Styles 1. Unidirectional 2. Aligned	A. Vocabulary B. Spelling C. Note taking 1. Chalkboard 2. Overhead projector 3. Textbook D. Following directions E. Functional reading skills	A. Measurement 1. Use of scale 2. Use of protractor B. Whole numbers C. Fractions D. Geometry 1. Circles 2. Arcs 3. Polygons 4. Angles a. right b. acute c. obtuse		A. The student will be able to identify the principles of dimensioning B. The student will be able to distinguish between 1. Aligned 2. Unidirectional C. The student will be able to dimension architectural and engineering drawings

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Make an assembly drawing from a series of detail drawings II. Layout a parts list schedule	A. Draw details of parts B. Object lines C. Hidden lines D. Materials indications E. Overall dimensions F. Label each part G. Auxiliary views where necessary H. Shop practices I. Fillets and rounds	A. Note taking B. Vocabulary C. Spelling D. Problem solving E. Transcribing information from the chalkboard F. Interpreting charts	A. Measurement 1. Spacing of views 2. Location of assembly B. Fractions C. Decimals D. Geometry 1. Circles 2. Arcs E. Whole numbers	Materials 1. Steel 2. Cast iron 3. Aluminum 4. Brass 5. Bronze	A. The student will be able to layout and draw a complete sectional assembly drawing B. The student will be able to develop a complete parts list detailing all components used in the assembly 1. Name of part 2. Material 3. Quantity

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Draw a three dimensional object from a series of two dimensional views II. Distinguish between true length and non-isometric lines	A. Isometric lines B. Non-isometric lines C. Glass cube D. Constructing irregular curves by offset method E. Constructing circles in isometric 1. Four center method 2. Ellipse template F. Arcs in isometric G. Isometric sections 1. Material symbols 2. Cutting plane	A. Note taking B. Textbook use C. Problem solving D. Vocabulary - technical terms E. Transcribe information from chalkboard	A. Geometry - ellipses 1. Minor axis 2. Major axis B. Measurement - fore shortening C. Proportion 1. Length 2. Width 3. Depth D. Fractions		A. The student will be able to identify the three isometric axis planes B. The student will be able to construct a circle in isometric C. The student will be able to measure true lengths along an isometric axis line D. The student will be able to construct a non-isometric line

UNIT: TECHNICAL DRAWING - CONTINUED

TOPIC: PERSPECTIVE DRAWING

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Develop a two point perspective from two orthographic views II. Label the perspective variables	A. Nomenclature 1. Picture plane 2. Station point 3. Horizon line 4. Vanishing point 5. True height B. Variables 1. Relationship of object to picture plane 2. Heights of horizon from ground line C. Types of perspective 1. One point (parallel) 2. Two point (angular) D. Methods of drawing 1. Common office method 2. Plan method 3. Grid system	A. Vocabulary B. Note taking 1. Chalkboard 2. Overhead projector C. Spelling D. Problem solving	A. Measurement B. Geometry C. Whole numbers D. Fractions		A. The student will be able to make an angular perspective drawing from a given plan and elevation B. The student will be able to make a parallel perspective drawing from two views C. The student will be able to label the variables on a perspective drawing

TOPIC: INKING

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Develop an ink drawing from a pencil layout II. Note and dimension an ink drawing using a technical pen III. Note and dimension an ink drawing using Leroy lettering equipment	A. Ruling pen B. Inking triangles 1. 45° 2. 30°/60° C. Inking powder D. Ink adapter for compass 1. Beam 2. Bow 3. Drop bow E. Drawing medium 1. Vellum 2. Mylar F. Erasing techniques G. Technical Pen H. Leroy lettering 1. Scriber 2. Template	A. Transcribing notes from chalkboard B. Following directions C. Functional reading skills	A. Whole numbers B. Fractions C. Measurement 1. Standard 2. Metric	Applied chemistry - compositions of ink	A. The student will be able to make an ink drawing from a pencil layout B. The student will be able to letter an ink drawing using a technical pen C. The student will be able to demonstrate the ability to use a Leroy lettering set

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify types of detail drawings II. Illustrate necessary detail drawings for selected objects	A. Determine number of views B. Orthographic projection - three views C. Sectional views D. Isometric view E. Dimensioning F. Parts list G. Auxiliary views H. Descriptive geometry I. Material indications J. General notes	A. Vocabulary B. Spelling C. Note taking D. Problem solving E. Interpretation of charts	A. Fractions B. Decimals C. Geometry D. Measurement	Applied chemistry - materials	A. The student will be able to list necessary detail drawings B. The student will be able to draw necessary details of a machine part

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify various methods used in manufacturing II. Illustrate selected shop methods	A. Pattern shop B. Castings C. Foundry D. Forgings E. Machining F. Lathe G. Drill press H. Boring I. Turning J. Threading K. Drilling L. Milling M. Grinding N. Welding	A. Vocabulary B. Spelling C. Note taking 1. Chalkboard 2. Reference books D. Functional reading skills	A. Measurement 1. English 2. Metric B. Geometry 1. Radii 2. Diameter 3. Curves	A. Metallurgy B. Applied physics 1. Compression 2. Tension	A. The student will be able to list methods used in manufacturing B. The student will be able to draw diagrams of selected shop methods

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify common fasteners used in design of devices II. Illustrate selected fastening devices	A. Screws 1. Machine 2. Wood 3. Set screw 4. Cap screw 5. Stud B. Bolts 1. Round heads 2. Square 3. Hexagonal 4. Threads C. Nuts D. Turnbuckle E. Wing nut F. Lock washers G. Key H. Springs I. Materials	A. Vocabulary B. Spelling C. Note taking 1. Chalkboard 2. Reference books D. Functional reading skills	Measurement 1. English 2. Metric	A. Metallurgy B. Applied physics 1. Compression 2. Tension	A. The student will be able to list common fasteners B. The student will be able to draw details of selected fasteners

UNIT: RESIDENTIAL DESIGN

TOPIC: PLANNING

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Selection of building site II. Determine room requirements III. Determine family functions IV. Identify budget restrictions	A. Zoning regulations 1. Setbacks 2. Lot coverage 3. Easements 4. Use restrictions 5. Height restrictions B. Site conditions 1. Contours 2. Terrain features C. Mechanical equipment D. Orientation of house to site - solar E. Structural system F. Exterior style	A. Vocabulary B. Spelling C. Note taking 1. Chalkboard 2. Verbal 3. Textbook 4. Reference book D. Problem solving E. Functional reading skills	A. Measurement 1. Architects scale 2. Contours 3. Dimensions 4. Angles B. Computations 1. Square feet 2. Cost C. Fractions D. Estimating	A. Physics 1. Heat 2. Light 3. Solar energy a. active b. passive B. Ecology 1. Waste removal 2. Fuels 3. Water	A. The student will be able to locate a home on a site with respect to all zoning regulations B. The student will be able to determine the exterior design of a house C. The student will be able to select an acceptable structural system

UNIT: RESIDENTIAL DESIGN - CONTINUED

TOPIC: PLANNING LIVING AREA

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify rooms comprising living area II. Sketch basic room planning furniture arrangements	A. Rooms 1. Living 2. Dining 3. Foyer 4. Family - great room 5. Den 6. Library 7. Solarium B. Furniture 1. Sofa 2. Chairs 3. End tables 4. Love seat 5. Cocktail table 6. Entertainment center 7. Dining table 8. Buffet 9. China cabinet	A. Vocabulary B. Spelling C. Note taking 1. Chalkboard 2. Overhead projector D. Functional reading skills	A. Measurement - architect's scale B. Computations - square footage C. Whole numbers D. Fractions	Applied physics 1. Heat 2. Light	A. The student will be able to list the rooms comprising the living area B. The student will be able to sketch furniture used in the living area

UNIT: RESIDENTIAL DESIGN - CONTINUED

TOPIC: PLANNING SERVICE AREA

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify rooms comprising the service area II. Sketch basic room planning furniture arrangements	A. Room names 1. Kitchen 2. Laundry area 3. Pantry 4. Utility area 5. Garage 6. Carport B. Furniture and layout 1. Kitchen a. cabinets b. appliances 2. Laundry a. washer b. dryer c. sink C. Electrical design	A. Vocabulary B. Spelling C. Note taking D. Functional reading skills	A. Measurement - architect's scale B. Computations - square footage C. Whole numbers D. Fractions	Applied physics 1. Heat 2. Light	A. The student will be able to list the rooms comprising the service area B. The student will be able to sketch furniture and appliances used in the service area

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify rooms comprising sleeping area II. Sketch basic room planning furniture arrangements	A. Room names 1. Bedrooms 2. Bathrooms 3. Closets a. linen b. standard c. walk in B. Furniture 1. Beds 2. Dressers 3. Chairs 4. Tables 5. Desks C. Bathroom fixtures 1. Tubs 2. Showers 3. Water closet 4. Bidet 5. Sinks 6. Jacuzzi	A. Spelling B. Vocabulary 1. Room names 2. Fixtures C. Note taking skills D. Functional reading skills	A. Measurement - architect's scale B. Computation - square footage C. Whole numbers D. Fractions	Applied physics 1. Plumbing a. pressure b. gravity 2. Heat 3. Light	A. The student will be able to list the rooms comprising the sleeping area B. The student will be able to sketch furniture and fixtures used in the sleeping area

UNIT: RESIDENTIAL CONSTRUCTION

TOPIC: WOOD GIRDER DESIGN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify variables in determining girder sizing II. Compute loads on girder III. Select proper wood girder from appropriate span charts	A. Span of girder B. Bay area C. Type 1. Built up 2. Solid D. Girder load area E. Design load PSF 1. Dead 2. Live F. Wood type 1. Southern yellow pine 2. Select structural 3. Douglas fir G. Computations H. Span charts	A. Parts of textbook B. Note taking 1. Chalkboard 2. Overhead projector C. Vocabulary D. Spelling	A. Measurement B. Fractions C. Whole numbers D. Algebra 1. Flexure formula $M = \frac{wlin}{R}$ 2. Section modulus $S = \frac{M}{F}$	Applied physics 1. Tension 2. Compression 3. Stress 4. Shear 5. Bending	A. The student will be able to compute the loads on a giving girder B. The student will be able to select the proper girder from span charts

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Design and construction of footings II. Design and construction of foundations III. Design and construction of slabs	A. Frost depth B. Design principles 1. Load bearing capacities 2. Load calculations 3. Steel reinforcing 4. 3000 PSI concrete C. Pilasters D. Types of block 1. Concrete 2. Cinder 3. Stretcher 4. Solid cap 5. Corner E. Pressure treated wood foundations F. Column footings G. Foundation types 1. Crawl space 2. Basement 3. Slab on grade H. Monolthic pour I. Wire mesh J. Vapor barrier K. Columns and piers	A. Spelling B. Vocabulary - construction terminology C. Note taking 1. Chalkboard 2. Verbal D. Problem solving	A. Computations 1. Number of blocks 2. Thickness of slab B. Measurement C. Whole numbers D. Fractions E. Engineering charts	Applied chemistry 1. Composition of concrete a. sand b. water c. portland cement d. aggregate 2. Curing process - 1.28 day strength	A. The student will be able to draw various foundation systems B. The student will be able to design adequate concrete footings C. The student will be able to identify slab types

UNIT: RESIDENTIAL CONSTRUCTION - CONTINUED

TOPIC: WALL CONSTRUCTION PRINCIPLES

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify wood wall framing members II. Identify difference between platform and balloon framing	A. Platform framing 1. Sill - pressure treated 2. Floor joists 3. Header 4. Beams/Girders 5. Bridging a. metal b. wood 6. Subfloor 7. Sole 8. Stud 9. Sheathing a. plywood b. insulated 10. Corner bracing B. Balloon framing 1. Sill 2. Floor joists 3. Studs 4. Ribbon 5. Sheathing	A. Spelling B. Vocabulary C. Note taking D. Sketching E. Problem solving F. Charts - floor joists span tables	A. Measurement - architects scale B. Computations - quantities of materials C. Fractions D. Size of rough lumber 1. Nominal 2. Actual	A. Applied chemistry 1. Pressure treating chemicals 2. Waterproofing compounds B. Applied physics - forces on structural components 1. Shear 2. Compression 3. Tension 4. Bending	A. The student will be able to identify the structural and non-structural components of 1. Platform framing 2. Balloon framing B. The student will be able to select floor joist sizes from span tables

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify roof types II. List roof covering materials III. Draw cornice details for assigned roof conditions	A. Roof types 1. Flat 2. Shed 3. Gable 4. Hip 5. Gambrel 6. Mansard B. Roof coverings 1. Built up a. tar b. building paper c. gravel d. gravel stop 2. Asphalt shingles a. building paper b. decking 3. Wood shingles 4. Clay tile 5. Metal roofing 6. Fiberglass C. Ventilation 1. Ridge vent 2. Gable vents 3. Soffit louvers	A. Spelling B. Vocabulary C. Note taking skills 1. Chalkboard 2. Textbook D. Matching 1. Roof types 2. Materials	A. Measurement - architect's scale B. Computations - quantity of shingles C. Geometry 1. Roof pitch a. slope b. run 2. Angles - valley rafter 3. Roof intersections	A. Ecology - recyclable materials B. Applied physics 1. Condensation 2. Heat - loss through roof construction	A. The student will be able to identify various roof types B. The student will be able to list the various materials used in residential construction C. The student will be able to draw selected cornice details including all appropriate notes

UNIT: RESIDENTIAL CONSTRUCTION - CONTINUED

TOPIC: POST AND BEAM

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify post and beam components II. Illustrate post and beam construction	A. Foundation B. Band joist C. Floor beam D. Structural planking E. Post F. Beam between posts G. Roof beam H. Ridge beam I. Roof decking J. BOCA code K. Steel connectors	A. Parts of textbook B. Functional reading skills - manufacturers' catalogs C. Vocabulary D. Spelling	A. Whole numbers B. Fractions C. Measurement D. Algebra	Applied physics 1. Stress diagrams 2. Loading charts	A. The student will be able to list the components of post and beam construction B. The student will be able to draw details of post and beam construction

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. List various materials used for exterior finishes on residential structures II. Accurately draw symbols and textures of various materials	A. Wood siding 1. Bevel 2. Cedar shakes 3. Vertical a. cedar b. redwood c. tongue and groove d. V-joint 4. Board and batten 5. Exterior plywood B. Masonry 1. Brick veneer - modular 2. Stone veneer - random 3. Concrete block a. painted b. stucco C. Aluminum siding D. Vinyl siding E. Sheet hardboard paneling	Vocabulary 1. Construction terminology 2. Spelling 3. Note taking skills 4. Sketching	A. Measurement B. Whole numbers C. Fractions - thickness of materials D. Computation - quantity of siding	Applied chemistry 1. Wood stain products 2. Masonry composition	A. The student will be able to identify finishes used in residential construction B. The student will be able to graphically convey exterior finish materials on appropriate medium

UNIT: RESIDENTIAL CONSTRUCTION - CONTINUED

TOPIC: WOOD TRUSSES

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify common roof truss types II. List structural components of a wood truss III. Draw a typical fink truss	A. Types of wood trusses 1. Fink 2. King post 3. Scissors 4. Bowstring 5. Sawtooth B. Structure 1. Top chord 2. Bottom chord 3. Web 4. Gussets	A. Spelling B. Vocabulary - construction terms C. Note taking skills 1. Chalkboard 2. Overhead projector	A. Fractions B. Whole numbers C. Measurement D. Geometry - triangulation E. Trigonometry - calculation of angles	Applied physics 1. Tension 2. Compression 3. Transfer of forces	A. The student will be able to list 1. Roof truss types 2. Components B. The student will be able to draw various wood truss designs 1. Fink 2. King post 3. Scissors

UNIT: RESIDENTIAL CONSTRUCTION - CONTINUED

TOPIC: BRICK VENEER CONSTRUCTION

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. List components of brick veneer construction II. Identify various brick bond patterns III. Draw a detail that illustrates brick veneer construction	A. Method of construction 1. Face brick 2. Air space 3. Metal ties 4. Mortar B. Increase concrete footing size C. 12" concrete block for ledge D. Weep holes for drainage E. Bonding 1. Running 2. Stack 3. Flemish 4. Soldier	A. Vocabulary B. Spelling C. Note taking skills - chalkboard D. Functional reading skills - textbook	A. Measurement - architect's scale B. Computations - square feet of coverage C. Whole numbers D. Fractions	A. Applied chemistry 1. Mortar mixture 2. Composition of brick - clay B. Applied physics 1. Forging process 2. Stacking theory	A. The student will be able to list components used for brick veneer B. The student will be able to sketch various brick bonds and patterns

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. List various windows by type II. Illustrate construction and installation of windows in various wall configurations III. List types of glass used in windows	A. Window types 1. Double hung 2. Single hung 3. Casement 4. Awning 5. Hopper 6. Picture 7. Sliding 8. Jalousie 9. Bow 10. Bay B. Window construction 1. Head 2. Jamb 3. Sill 4. Meeting rail 5. Mullion 6. Muntin C. Rough opening 1. Unit dimension 2. Actual 3. Nominal D. Insulated glass	A. Spelling B. Vocabulary 1. Window manufacturers 2. Trade names C. Read manufacturers' charts D. Use of textbook	A. Measurement B. Whole numbers C. Fractions 1. Actual size of windows 2. Rough opening	Applied chemistry - window finishes 1. Stain 2. Waterproofing compounds 3. Vinyl 4. Paint	A. The student will be able to list various window types B. The student will be able to identify types of glass used in window construction C. The student will be able to draw details illustrating windows in various wall constructions

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify various doors by type II. Illustrate construction and installation of doors in various wall configurations III. Identify materials used in door construction	A. Door types 1. Flush a. hollow core b. solid core 2. Panel 3. French 4. Dutch 5. Sliding 6. Bifold 7. Pocket 8. Folding B. Door construction 1. Head 2. Jamb 3. Sill C. Rough framing D. Hardware E. Fireproof doors F. Sliding glass doors G. Overhead doors H. Basement access doors	A. Spelling B. Vocabulary - manufacturers' catalogs C. Outlining skills D. Note taking skills E. Interpretation of diagrams	A. Measurement B. Whole numbers C. Fractions D. Graphs E. Estimating	Applied chemistry 1. Paint 2. Varnish	A. The student will be able to list various door types B. The student will be able to draw common doors in elevation C. The student will be able to draw details showing the integration of doors into various wall configuration

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify various stairs by construction II. Identify stair design by type III. Layout a wood stair for a standard residence	A. Types of stairs 1. Straight run 2. U shape 3. L shape 4. Exterior 5. Interior B. Construction 1. Materials a. wood b. concrete c. steel 2. Treads and risers 3. Carriage 4. Stringer a. open b. closed 5. Platform 6. Landing 7. Railing 8. Stairwell 9. Headroom 10. Handrail C. BOCA code	A. Spelling B. Vocabulary 1. Construction terms 2. Nomenclature of types C. Note taking skills D. Interpretation of diagrams	A. Measurement B. Geometry - angle of stairway C. Ratio and proportion - relationship between rise and run D. Whole numbers E. Fractions	Applied chemistry - material reactions 1. Concrete 2. Wood - finishes	A. The student will be able to list various stair types B. The student will be able to list methods of stair construction C. The student will be able to draw a stair layout for a typical residence

UNIT: RESIDENTIAL CONSTRUCTION - CONTINUED

TOPIC: FIREPLACE CONSTRUCTION

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify structural components of a typical fireplace II. Identify types of fireplaces III. Illustrate construction of masonry fireplace	A. Types 1. Single face 2. Corner 3. Back to back B. Metal fireplaces 1. Free standing 2. Zero clearance C. Construction 1. Flue size 2. Combustion chamber 3. Hearth - fireproof 4. Firebox - fire brick 5. Chimney 6. Framing 7. Reinforced concrete	A. Vocabulary - nomenclature B. Spelling C. Charts 1. Flue size 2. Materials D. Note taking skills	A. Measurement B. Fractions C. Whole numbers D. Graphs - throat size of flue E. Quantities	A. Applied chemistry 1. Combustion rate of materials 2. Creosote B. Ecology - fuels	A. The student will be able to list structural components of a standard masonry fireplace B. The student will be able to list the various types of fireplaces C. The student will be able to draw details of fireplace construction

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify basic kitchen styles II. Layout cabinets according to manufacturers' specifications III. Illustrate design of kitchen	A. Styles of kitchens 1. L shape 2. Straight line 3. Corridor 4. U shape 5. Peninsula 6. Island B. Appliances 1. Refrigerator 2. Range a. drop in b. free standing c. cook top 3. Oven a. double b. microwave c. wall type 4. Sink C. Cabinets 1. Wall hung 2. Base D. Materials 1. Wood 2. Formica 3. Vinyl	A. Spelling B. Vocabulary - design terms C. Note taking skills D. Functional reading skills 1. Manufacturers' catalogs 2. Textbook	A. Measurement 1. Length of walls 2. Ceiling height B. Fractions C. Whole numbers D. Estimating E. Computations	Applied chemistry 1. Characteristics of wood 2. Composition of finishes	A. The student will be able to list the various kitchen styles B. The student will be able to draw kitchen cabinet details for a selected residence

UNIT: RESIDENTIAL WORKING DRAWINGS

TOPIC: SITE PLAN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify site plan requirements II. Layout property lines III. Illustrate a site plan for a selected residence	A. Requirements 1. Corners 2. Building location 3. Meridian arrow 4. Contour lines 5. Trees, shrubs 6. Streets, driveways 7. Easements 8. Lot and block number 9. Scale B. Property lines 1. Bearings 2. Distances 3. Setbacks 4. Zoning 5. Utilities	A. Spelling B. Vocabulary C. Parts of textbook/manual D. Overhead projector	A. Whole numbers B. Fractions C. Measurement - civil engineer's scale D. Geometry - angles E. Trigonometry 1. Sine 2. Tangent	A. Applied chemistry 1. Soil composition 2. Hazardous chemicals B. Applied physics 1. Septic system 2. Hydronics	A. The student will be able to list site plan requirements B. The student will be able to layout and draw a site plan for a selected residence

UNIT: RESIDENTIAL WORKING DRAWINGS - CONTINUED

TOPIC: FOUNDATION PLAN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify type of foundation II. Determine structural requirements of the house III. Illustrate a foundation plan for a selected residence	A. Layout of foundation plan B. Type 1. Basement 2. Crawl space 3. Slab on grade C. Pilasters D. Procedure for drawing a foundation plan 1. Layout walls 2. Locate windows or vents 3. Layout stairs if basement 4. Indicate framing 5. Indicate footings 6. General notations 7. Dimensioning 8. Crosshatching 9. Checking E. Bilco door F. BOCA regulations G. Wood foundation H. Girder	A. Spelling B. Vocabulary 1. Trade names 2. Nomenclature C. Note taking skills D. Functional reading skills E. Use of textbook	A. Measurement B. Computations 1. Concrete slab 2. Block 3. Footings C. Whole numbers D. Fractions	A. Applied chemistry - concrete composition 1. Cement 2. Sand 3. Water 4. Concrete B. Applied physics - structure 1. Tension 2. Compression 3. Shear	A. The student will be able to identify footing requirements B. The student will be able to determine girder requirements C. The student will be able to draw a complete foundation plan for a residence to appropriate scale

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify rooms of the floor plan II. Locate bearing partition III. Illustrate a complete floor plan for a selected residence	A. Design of the floor plan B. Procedure for drawing a floor plan 1. Layout partitions 2. Locate doors and windows 3. Layout stairs 4. Layout kitchen and bathroom fixtures 5. Draw electrical features 6. Indicate framing 7. Dimensioning 8. Lettering 9. Crosshatching 10. Checking	A. Spelling B. Vocabulary 1. Room names 2. Catalogs C. Note taking skills 1. Chalkboard 2. Overhead projector D. Writing skills 1. General notes 2. Dimensioning	A. Measurement - architect's scale B. Computations - square footage C. Whole numbers D. Fractions	Applied physics - structural considerations 1. Tension 2. Compression 3. Shear	A. The student will be able to list room names B. The student will be able to select proper floor and ceiling joist sizes from span charts C. The student will be able to draw a complete floor plan for a residence to appropriate scale

UNIT: RESIDENTIAL WORKING DRAWINGS

TOPIC: ELEVATIONS (EXTERIOR)

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify elevations A. Front B. Rear C. Sides II. Relate elevations to plan view III. List materials on walls and roof IV. Illustrate necessary elevation views for a selected residence	A. Project elevations from floor plans 1. Locate footing line 2. Locate floor lines 3. Locate grade line 4. Block out all features 5. Add textures 6. Add notes and dimensions 7. Titles 8. Checking B. Materials 1. Roof 2. Walls 3. Structural components	A. Spelling B. Vocabulary C. Chalkboard D. Overhead projector E. Functional reading skills	A. Measurement - architect's scale B. Computations - dimensions C. Whole numbers D. Fractions		A. The student will be able to identify exterior elevations B. The student will be able to layout four elevations of a selected residence C. The student will be able to label notes, dimensions and materials on the elevations

UNIT: RESIDENTIAL WORKING DRAWINGS - CONTINUED

TOPIC: CROSS SECTION

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify location of cutting plane II. Determine appropriate scale III. Illustrate a cross section for a selected residence	A. Cutting plane B. Materials indications 1. Footing 2. Foundation 3. Joists 4. Walls 5. Ceiling 6. Roof 7. Bridging 8. Insulation 9. Piers and columns 10. Girder C. Grosshatching D. Notes E. BOCA code	A. Spelling B. Vocabulary - materials C. Note taking skills 1. Chalkboard 2. Overhead projector 3. Textbook	A. Measurement B. Whole numbers C. Fractions 1. Actual size 2. Nominal size D. Formulas - weight per foot	Applied physics - vectors 1. Stress on roof 2. Weight on joists	A. The student will be able to locate a cutting plane B. The student will be able to select an appropriate scale C. The student will be able to draw a complete cross section for a selected residence

UNIT: RENDERING

TOPIC: TYPES OF RENDERING

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify types of rendering II. Illustrate renderings of various techniques	A. Pencil 1. Types of lead 2. Prepare pencil 3. Materials and textures 4. Entourage B. Pen and ink 1. Paper 2. Pen types 3. Tones 4. Texture C. Water color 1. Pigments 2. Brushes 3. Dishes 4. Palettes 5. Mediums 6. Washes 7. Texture 8. Built up method	A. Spelling B. Note taking C. Vocabulary D. Reference books	A. Layout B. Measurement	Applied chemistry - composition of pigments	A. The student will be able to list various rendering techniques B. The student will be able to render a series of sketches using various mediums

UNIT: RENDERING - CONTINUED

TOPIC: COLOR: FACT AND THEORY

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify properties of color II. Illustrate a color wheel using watercolor paints	A. Color and light B. Psychological effects of color C. Chromatic circles of solids D. Pigment E. Color schemes 1. One color 2. Analagous 3. Complements 4. Triads F. Values G. Color wheel	A. Note taking B. Vocabulary C. Spelling	A. Layout B. Geometry - layout of wheel C. Measurement	Applied chemistry 1. Paint 2. Paper 3. Color mixing	A. The student will be able to list properties of color B. The student will be able to layout and draw a color wheel

UNIT: RENDERING - CONTINUED

TOPIC: HISTORY/RULES OF COMPOSITION

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify early forms of rendering II. Identify rules of composition	A. History 1. Egyptian 2. Monasteries 3. Renaissance 4. Delineation in America B. Composition 1. Unity 2. Emphasis 3. Value 4. Abstract C. Sketch D. Color study E. Matting	A. Note taking B. Vocabulary C. Parts of textbook/manual	A. Measurement B. Layout	Applied chemistry 1. Paper 2. Paint 3. Thinners 4. Color mixing	A. The student will be able to list early rendering techniques B. The student will be able to list the rules of composition

UNIT: ENERGY EFFICIENT DESIGN

TOPIC: ACTIVE SOLAR ENERGY DESIGN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify active solar strategies II. Identify system components III. Illustrate an active solar system	A. History - energy crisis B. Strategies 1. Collection 2. Storage 3. Distribution C. Liquid system 1. Type of liquid a. water b. anti-freeze 2. Pump 3. Tank 4. Piping D. Air system 1. Rock storage 2. Water storage E. Insulation F. Roof top collectors G. Space heating H. Domestic hot water I. Swimming pool heater J. Heat exchanger K. Back up system	A. Spelling B. Vocabulary C. Note taking skills 1. Chalkboard 2. Textbook 3. Dukane projector D. Problem solving E. Functional reading skills	A. Measurement B. Fractions C. Whole numbers D. Algebra 1. Heat loss 2. Heat gain	A. Applied chemistry - heat storage abilities B. Applied physics 1. Heat gain 2. Ultraviolet rays 3. Photovoltaics 4. Light	

UNIT: ENERGY EFFICIENT DESIGN - CONTINUED

TOPIC: PASSIVE SOLAR ENERGY DESIGN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify passive solar strategies II. Identify system components III. Define A. Direct B. Indirect C. Isolated IV. Illustrate a passive solar system	A. History 1. Romans 2. Energy crisis 3. Mesa verde B. Strategies 1. Collection 2. Storage 3. Distribution C. Direct gain - south facing glazing D. Indirect gain 1. Trombe wall 2. Water storage E. Isolated gain - solar greenhouse F. Thermosyphin G. Structure as the system H. Diffused radiation I. Hybrid system J. Convection	A. Spelling B. Vocabulary C. Note taking skills 1. Chalkboard 2. Textbook 3. U.S. Department of Energy D. Problem solving E. Functional reading skills	A. Measurement B. Fractions C. Whole numbers D. Algebra E. Trigonometry - solar angle	A. Applied chemistry 1. Heat 2. Phase change materials B. Applied physics 1. Heat gain 2. Ultraviolet rays 3. Light transmission	A. The student will be able to list passive solar energy strategies B. The student will be able to illustrate direct, indirect and isolated solar gain C. The student will be able to draw a passive solar heating system for a selected building

UNIT: COMMERCIAL CONSTRUCTION

TOPIC: WINDOWS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. List various windows by type II. Illustrate construction of windows in various wall configurations	A. Window types 1. Double hung 2. Casement 3. Awing 4. Fixed B. Construction 1. Head 2. Jamb 3. Sill C. Fire codes D. Openings 1. Rough 2. Masonry E. Glass 1. Insulated 2. Solar F. Materials 1. Wood 2. Steel 3. Aluminum 4. Clad	A. Vocabulary - trade names B. Spelling C. Parts of textbook/manual D. Note taking	A. Whole numbers B. Fractions C. Measurement D. Estimating	Applied chemistry 1. Stain 2. Waterproofing compounds 3. Vinyl 4. Paint	A. The student will be able to list various window types B. The student will be able to draw details illustrating windows in various wall configurations

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify various doors by type II. Illustrate construction and installation of doors in various wall configurations	A. Door types 1. Flush a. hollow metal b. solid core 2. Panel 3. Fire rated B. Door construction 1. Head 2. Jamb 3. Sill C. Opening size 1. Rough 2. Masonry D. Hardware E. Overhead doors	A. Spelling B. Vocabulary C. Outlining and note taking D. Interpretation of diagrams	A. Measurement B. Whole numbers C. Fractions D. Graphs E. Estimating	Applied chemistry 1. Paint 2. Varnish 3. Fireproofing 4. Waterproofing	A. The student will be able to list various door types B. The student will be able to draw details showing the integration of doors into various wall configurations

UNIT: COMMERCIAL WORKING DRAWINGS

TOPIC: SITE PLAN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify site plan requirements II. Illustrate a site plan for a selected residence	A. Requirements 1. Corners 2. Building location 3. Meridian arrow 4. Contour lines 5. Trees, shrubs 6. Streets, driveways 7. Easements 8. Lot and block number 9. Scale B. Property lines 1. Bearings 2. Distances 3. Setbacks 4. Zoning 5. Utilities	A. Spelling B. Vocabulary C. Parts of textbook/manual D. Overhead projector	A. Whole numbers B. Fractions C. Measurement - civil engineer's scale D. Geometry - angles E. Trigonometry - functions	A. Applied chemistry 1. Soil composition 2. Hazardous chemicals B. Applied physics - hydronics	A. The student will be able to list site plan requirements B. The student will be able to layout and draw a site plan for a selected residence

UNIT: COMMERCIAL WORKING DRAWINGS - CONTINUED

TOPIC: FOUNDATION PLAN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify type of foundation II. Identify structural requirements of building III. Illustrate a foundation plan for a selected building	A. Design of foundation B. Layout procedure 1. Locate footing line 2. Center foundation on footing 3. Indicate framing above 4. Locate column footings 5. General notations 6. Dimensioning 7. Crosshatching 8. Checking C. BOCA regulations	A. Vocabulary B. Spelling C. Note taking D. Functional reading skills E. Parts of textbook	A. Measurement B. Computations 1. Concrete slab 2. Block 3. Footings C. Whole numbers D. Fractions	A. Applied chemistry - concrete composition and curing process B. Applied physics - structure 1. Tension 2. Compression 3. Shear	A. The student will be able to compute footing requirements B. The student will be able to select proper block size C. The student will be able to draw a complete foundation plan for a selected commercial building

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify rooms of the floor plan II. Locate bearing partitions III. Illustrate a complete floor plan for a selected commercial building	A. Design of floor plan B. Layout procedure 1. Locate walls and partitions 2. Locate doors and windows 3. Layout stairs 4. Layout bathroom areas 5. Draw electrical features 6. Indicate roof framing above a. wood b. steel joists c. concrete 7. Dimensioning 8. Lettering 9. Crosshatching 10. Checking	A. Vocabulary 1. Room names 2. Manufacturers' catalogs B. Spelling C. Note taking 1. Chalkboard 2. Overhead projector D. Writing skills 1. General notes 2. Dimensioning	A. Measurement - architect's scale B. Computations 1. Joist spacing 2. Dimensions C. Whole numbers D. Fractions	Applied physics - structural considerations 1. Tension 2. Compression	A. The student will be able to list room names B. The student will be able to size correct roof joists C. The student will be able to draw a complete floor plan for a selected commercial building

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify exterior elevations A. Front B. Rear C. Sides II. Identify materials on walls and roof III. Illustrate elevation views for a selected commercial building	A. Project elevations from floor plan 1. Locate footing line 2. Locate floor lines 3. Locate grade line 4. Block out all features 5. Add textures 6. Add notes and dimensions 7. Titles 8. Checking B. Materials 1. Roof 2. Walls	A. Vocabulary B. Spelling C. Functional reading skills D. Note taking 1. Chalkboard 2. Overhead projector	A. Measurement - architect's scale B. Computations - dimensions C. Whole numbers D. Fractions		A. The student will be able to identify exterior elevations B. The student will be able to draw exterior elevations for a selected commercial building

UNIT: COMMERCIAL WORKING DRAWINGS - CONTINUED

TOPIC: CROSS SECTION

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify location of cutting plane II. Determine appropriate scale III. Illustrate a cross section for a selected commercial building	A. Cutting plane B. Materials indication 1. Footing 2. Foundation 3. Slab 4. Walls 5. Joists 6. Ceiling 7. Bridging 8. Lintels 9. Columns 10. Reinforcement 11. Roofing 12. Insulation C. Dimensions D. BOCA code	A. Vocabulary - materials B. Spelling C. Note taking 1. Chalkboard 2. Overhead projector D. Parts of textbook	A. Measurement B. Whole numbers C. Fractions 1. Actual size 2. Nominal size D. Formulas - weight per foot	Applied physics 1. Stress a. roof b. slab 2. Weight on joists	A. The student will be able to locate a cutting plane B. The student will be able to select an appropriate scale C. The student will be able to draw a complete cross section for a selected commercial building

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Select proper open web steel joists II. Layout a roof framing plan for a selected commercial structure	A. Open web steel joist selection B. Layout of plan 1. Exterior walls 2. Column locations 3. Beam locations 4. Spacing of joists 5. Dimensioning 6. Lettering 7. Checking C. Bridging D. Structural notes E. Wall bracing F. Load bearing construction	A. Vocabulary B. Spelling C. Note taking D. Writing skills	A. Measurement B. Computations - joist spacing C. Algebra - deflection formula D. Fractions E. Whole numbers	Applied physics 1. Tension 2. Compression 3. Shear	A. The student will be able to select proper steel joist sizes from table B. The student will be able to draw a roof framing plan for a selected commercial structure

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Select proper steel columns II. Select proper steel beams III. Select proper steel joists IV. Illustrate a complete steel framing plan for a selected commercial structure	A. Select appropriate structural steel members from AISC Manual of steel construction 1. Beams 2. Columns 3. Joists B. Bridging C. Dimensions D. General notes E. Checking F. Cutting plane indications	A. Vocabulary B. Spelling C. Note taking D. Writing skills	A. Computations 1. Spacing 2. Dimensions B. Fractions C. Whole numbers D. Measurement	Applied physics 1. Tension 2. Compression 3. Horizontal shear 4. Vertical shear 5. Bending stress	A. The student will be able to select proper structural members from AISC Steel Manual B. The student will be able to draw a complete steel framing plan for a selected commercial building

UNIT: STRUCTURAL DESIGN

TOPIC: OPEN WEB STEEL JOIST DESIGN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Structural calculations II. Select steel joists from AISC Manual	A. Span of joist B. Weight on joist C. Types of joists 1. Standard 2. Long span D. Structural properties E. Bending stress F. Extreme fibre stress	A. Note taking - chalkboard B. Spelling C. Vocabulary D. Functional reading skills - AISC Manual	Algebra 1. Stress - $ft = \frac{p}{A}$ 2. Elastic limit 3. Yield point 4. Ultimate strength	A. Applied chemistry - composition of steel B. Applied physics 1. Stress diagrams 2. Shear 3. Compression 4. Tension	A. The student will be able to perform steel joist calculations B. The student will be able to select appropriate joists for various loading conditions

UNIT: STRUCTURAL DESIGN - CONTINUED

TOPIC: STEEL COLUMN DESIGN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify types of structural steel used for columns II. Structural calculations III. Select column size from AISC Manual	A. Height of column B. Weight on column C. Column types 1. Wide flange 2. Tubular 3. Lally D. Structural properties E. Moment of inertia F. Radius of gyration G. Fireproofing	A. Functional reading skills - AISC Manual B. Vocabulary C. Spelling D. Note taking - chalkboard	Algebra 1. Moment of inertia Iy(in.4) 2. Radius of gyration ratio rx/ry 3. Bending Bx and By	A. Applied chemistry - composition of structural steel B. Applied physics 1. Stress 2. Shear 3. Compression 4. Tension	A. The student will be able to list types of shapes used for steel columns B. The student will be able to perform steel column calculations C. The student will be able to select appropriate columns from the AISC Manual

UNIT: STRUCTURAL DESIGN - CONTINUED

TOPIC: STEEL BEAM DESIGN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify types of structural steel used for beams II. Structural calculations III. Select beam size from AISC Manual	A. Span of beam B. Weight on beam C. Beam types 1. Wide flange 2. American standard 3. Channel 4. Junior beam D. Structural properties E. Bending stress F. Modulus of elasticity G. Extreme fibre stress	A. Note taking - chalkboard B. Vocabulary C. Spelling D. Functional reading skills - AISC Manual	Algebra 1. Flexure formula $M = \frac{Wln}{8}$ 2. Section modulus $S = \frac{M}{F}$ 3. Stress formula $f = \frac{P}{A}$ 4. Modulus of elasticity $E = \frac{Pl}{Ae}$ 5. Deflection $\frac{5Wl^3}{384\ EI}$	A. Applied chemistry 1. Composition of structural steel 2. Rustproofing 3. Fireproofing B. Applied physics 1. Stress diagrams 2. Shear 3. Compression 4. Tension	A. The student will be able to list types of shapes used for steel beams B. The student will be able to perform steel beam calculations C. The student will be able to select appropriate beams for various loading conditions

UNIT: STRUCTURAL DESIGN - CONTINUED

TOPIC: LAMINATED WOOD STRUCTURES

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify structural components II. Structural calculations III. Illustrate laminated wood details	A. Structural components 1. Arch 2. Beam 3. Column 4. Purlin 5. Decking B. Connections C. Bolts D. Spikes E. Bearing plate F. Thermal properties G. AITC H. Design tables	A. Note taking B. Functional reading skills 1. Manufacturers' catalogs 2. Textbook C. Vocabulary D. Spelling	A. Geometry 1. Dome structure 2. Arch spring line B. Algebra 1. Flexure formula $M = \frac{wl^2n}{8}$ 2. Stress formula $f = \frac{P}{A}$ 3. Deflection $\frac{5wl^3}{384\ EI}$	A. Applied chemistry - treated wood 1. Wolmanized 2. CCA B. Applied physics - loading diagrams	A. The student will be able to list structural components used in laminated construction B. The student will be able to draw details of laminated construction

UNIT: STRUCTURAL DESIGN - CONTINUED

TOPIC: REINFORCED CONCRETE DESIGN

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify structural members II. Structural calculations III. Illustrate details	A. Structural members 1. Beams 2. Columns 3. Lintels 4. Slabs 5. Stairs 6. Footings 7. Retaining wall 8. Grade beams B. Curing C. Prestressed concrete D. Reinforcing steel rods E. ASTM F. ACI	A. Vocabulary B. Spelling C. Note taking D. Functional reading skills	Algebra 1. Flexure formula $f = \frac{Mc}{I}$ 2. Resisting moment $Y = \frac{\Sigma(AY)}{\Sigma A}$ 3. Reinforcement ratio $P = \frac{As}{bd}$	A. Applied chemistry - curing process (28 day concrete) B. Applied physics 1. Stress diagrams 2. Tension 3. Compression 4. Shear	A. The student will be able to list types of structural members B. The student will be able to perform structural calculations C. The student will be able to draw appropriate concrete details

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. List electrical terms II. Illustrate electrical symbols III. Design and illustrate an electrical layout	A. Terms 1. Ampere 2. Circuit 3. Circuit breaker 4. Conductor 5. Fuse 6. Voltage 7. Watt B. Safety C. Service entrance D. Outlets 1. Standard 2. Heavy duty E. Lighting F. Residential G. Commercial H. Symbols 1. Outlets 2. Switches 3. Fixtures 4. Special a. dimmer b. TV c. cable I. National Electrical Code J. Electric heating	A. Vocabulary - nomenclature B. Spelling C. Note taking skills D. Functional reading skills - Sweet's catalog	A. Computations 1. Calculate number of circuits 2. Calculate number of outlets 3. Calculate amperage B. Fractions C. Whole numbers D. Algebra	Applied physics 1. Light 2. Heat 3. Conduction 4. Negative and positive 5. Current 6. Pressure 7. Ohms law	A. The student will be able to list electrical terms B. The student will be able to draw electrical symbols C. The student will be able to design and draw an electrical plan for a selected building

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. List plumbing terms II. Illustrate plumbing symbols III. Design and illustrate a plumbing layout	A. Water supply 1. Public 2. Private well B. Waste removal 1. Public 2. Septic C. Materials 1. Copper 2. PVC 3. Cast iron 4. Galvanized steel D. Trap E. Clean out F. Stacks G. Vents 1. Gases 2. Pressure H. Sump pump I. Water heater J. Gate valve K. Meter L. Hose bibb M. Drains N. BOCA code O. Plumbing code	A. Vocabulary - nomenclature B. Spelling C. Note taking skills 1. Chalkboard 2. Overhead projector 3. Textbook D. Problem solving E. Functional reading skills - Sweet's catalog	A. Measurement - length of piping B. Fractions C. Whole numbers D. Computations - number of fixtures	A. Applied chemistry 1. Organic materials 2. Bacteria 3. Chemical breakdown B. Applied physics 1. Gravity 2. Pressure C. Ecology - waste disposal	A. The student will be able to list plumbing terms B. The student will be able to draw various plumbing symbols C. The student will be able to design and draw a plumbing plan for a selected building

UNIT: MECHANICAL SYSTEMS - CONTINUED

TOPIC: CLIMATE CONTROL

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify heating and cooling systems II. Identify heating and cooling symbols III. Design and illustrate a climate control layout	A. Temperature control B. Humidity control C. Air circulation D. Types of heating systems 1. Forced warm air 2. Hydronic 3. Electric radiant 4. Heat pump E. Heat loss calculations 1. Resistivity 2. Conduction 3. Infiltration F. British thermal unit G. Ductwork H. Baseboard I. Thermostat J. Energy codes K. Fuels 1. Oil 2. Gas 3. Electric 4. Wood	A. Vocabulary B. Spelling C. Note taking skills D. Problem solving E. Functional reading skills	A. Measurement - layout of floor plan B. Fractions C. Whole numbers D. Algebra - heat loss calculations [H = AU(ti-to)]	A. Applied chemistry 1. Combustion of matter 2. Reactions B. Applied physics 1. Heat transfer 2. Nuclear energy 3. Friction C. Ecology - fuels	A. The student will be able to list climate control systems B. The student will be able to illustrate heating and cooling symbols C. The student will be able to design and draw a climate control plan for a selected building

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify DOS functions II. Demonstrate DOS functions as specified	A. Disk operating system - MS-DOS B. Commands 1. Directory 2. Format 3. Diskcopy 4. Batch files 5. Erase files 6. Backup disks C. Hard disk D. Floppy disk E. Math coprocessor F. Configuration	A. Keyboard skills B. Spelling C. Vocabulary D. Note taking	A. Decimals B. Integers C. Measurement D. Basic math		A. The student will be able to list various DOS functions B. The student will be able to perform various DOS functions

UNIT: COMPUTER AIDED DESIGN - CONTINUED

TOPIC: INTRODUCTION/ORIENTATION

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify components of a CAD system II. Perform basic DOS functions III. Identify main menu items	A. Hardware 1. Computer 2. Keyboard 3. Digitizer 4. Mouse 5. Plotter 6. Monitor B. Software 1. Auto CAD 2. Microsoft C. Main menu 1. Begin a drawing 2. Edit a drawing 3. Plot a drawing 4. File utilities	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking E. Problem solving	A. Integers B. Decimals C. Basic math		A. The student will be able to list the components of a CAD system B. The student will be able to perform basic DOS functions C. The student will be able to list main menu items

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify coordinates II. Configure the drawing III. IDentify function keys	A. Coordinates 1. Absolute 2. Relative 3. Polar B. Units C. Limits D. Scaling E. Status F. Function keys 1. Coordinates 2. Grid 3. Ortho 4. Snap 5. Tablet	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals C. Geometry - angles D. Basic math		A. The student will be able to list coordinates B. The student will be able to configure and set function keys on the computer

UNIT: COMPUTER AIDED DESIGN - CONTINUED

TOPIC: DRAW COMMANDS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify draw commands II. Construct circles III. Construct arcs and lines	A. Draw sub-menu 1. Line 2. Point 3. Circle a. radius b. diameter 4. Arc a. three points b. variables 5. Text - fonts 6. Trace - value B. Redraw C. Set the axis	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals C. Geometry - angles D. Basic math		A. The student will be able to list commands under the draw sub-menu B. The student will be able to construct circles, lines and arcs on a CAD system

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify modes and drawing aids II. Demonstrate use of modes and aids on a CAD system	A. Viewports B. Object snap modes 1. Center 2. Endpoint 3. Insert 4. Intersection 5. Midpoint 6. Nearest 7. Node 8. Quadrant 9. Perpendicular 10. Tangent 11. Quick C. Dragmode D. Quick text	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals C. Measurement D. Basic math		A. The student will be able to list modes and drawing aids B. The student will be able to perform various mode and aids operations on a CAD system

UNIT: COMPUTER AIDED DESIGN - CONTINUED

TOPIC: DISPLAY COMMANDS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify display commands II. Perform display commands	A. Zoom command 1. All 2. Center 3. Dynamic 4. Previous 5. Extents 6. Window B. Enlarge or reduce C. Regenerate D. Views - names E. Space shuttle drawing	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals C. Basic math		A. The student will be able to list the display commands B. The student will be able to preform various zoom and regeneration operations

UNIT: COMPUTER AIDED DESIGN - CONTINUED

TOPIC: INTERMEDIATE DRAW COMMANDS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify intermediate draw commands II. Perform intermediate commands	A. Ellipse 1. Axis and eccentricity 2. Axis and rotation 3. Center and two axes 4. Isometric circles B. Offset 1. Distance 2. Select object C. Chamfer D. Polygons 1. Inscribed 2. Circumscribed 3. Edge method E. Blocks 1. Nested 2. Write to disk F. Insert 1. Scale factors 2. Rotation angle 3. Drag insertion	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals		A. The student will be able to list intermediate draw commands B. The student will be able to perform intermediate commands

UNIT: COMPUTER AIDED DESIGN - CONTINUED

TOPIC: SUPPLEMENTARY DRAW COMMANDS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify supplementary draw commands II. Perform various commands on CAD	A. Text variables 1. Aligned 2. Centered 3. Fit 4. Middle 5. Right 6. Style B. Sketch command 1. Polyline sketches 2. Principles 3. Operation C. On screen linetypes 1. Listing 2. Loading D. Solid E. Hatch 1. Boundary definition 2. Pattern alignment	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals C. Geometry		A. The student will be able to list supplementary draw commands B. The student will be able to perform various draw commands on a CAD system

UNIT: COMPUTER AIDED DESIGN - CONTINUED

TOPIC: EDIT SUB-MENU

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify edit commands II. Perform edit commands on various CAD drawings	A. Object selection B. Erase C. Moving entities D. Copying entities E. Break F. Fillet G. Window, object or last H. Undo I. CTRL-C J. Chamfer K. Rotate L. Mirror M. Offset	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals C. Basic math D. Measurement		A. The student will be able to list edit commands B. The student will be able to perform various edit functions

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify dimensioning variables II. Perform dimensioning functions using CAD	A. Components 1. Line 2. Extension 3. Text 4. Leaders B. Linear 1. Horizontal 2. Vertical 3. Aligned 4. Rotated 5. Base line 6. Continue C. Angular D. Diameter E. Radius F. Variables	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals C. Geometry D. Measurement E. Basic math		A. The student will be able to list variables used in the dimension mode B. The student will be able to dimension a CAD drawing

UNIT: COMPUTER AIDED DESIGN - CONTINUED

TOPIC: INQUIRY AND UTILITY COMMANDS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify inquiry and utility commands II. Demonstrate use of commands	A. Identify B. List C. Distance D. Files E. Areas calculations 1. Point 2. Entity 3. Circle 4. Poly line 5. Add 6. Subtract F. Shell command G. Time command	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking	A. Integers B. Decimals C. Measurement D. Basic math		A. The student will be able to list utility and inquiry commands B. The student will be able to perform utility commands on various CAD drawings

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify plot options II. Make hard copy drawings from computer storage	A. Plotting 1. From drawing itself 2. From main menu B. Print plot - dot matrix C. Plotting units D. Plot origin E. Size F. Rotation G. Pen width H. Plot scaling	A. Keyboard skills B. Vocabulary C. Spelling D. Note taking 1. Chalkboard 2. Textbook	A. Integers B. Decimals C. Polar coordinates D. Geometry E. Measurement		A. The student will be able to list plotting options B. The student will be able to make hard copy drawings from computer data

UNIT: COMPUTER AIDED DESIGN - CONTINUED

TOPIC: INTERMEDIATE EDIT COMMANDS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identify edit commands II. Perform edit commands on CAD	A. Change 1. Color 2. Elevation 3. Layer 4. Line type 5. Thickness 6. Lines 7. Circles 8. Text B. Array 1. Rectangular 2. Circular C. Mirror 1. Text 2. Object D. Divide E. Measure F. Explode G. Trim H. Extend I. Rotate J. Scale K. Stretch	A. Vocabulary B. Spelling C. Note taking D. Keyboard skills	A. Integers B. Measurement C. Decimals D. Geometry		A. The student will be able to list intermediate edit commands B. The student will be able to perform intermediate edit commands on a CAD system